

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) Method for compensating thermal optical effects interacting with an optical beam in ~~in the beam path of an~~ arrangement containing optical components being traversed by said beam,

wherein ~~in the beam path for a~~ the purpose of ~~optical~~ compensation in a beam path of said beam being situated at least three optical transparent elements having ~~an intimate~~ a close thermal contact being used in co-operation,

adjacent elements of said at least three elements having different material properties,

said different material properties are

a different absorption for radiation of said beam,

a different conduction or

a different thermal dispersion,

said different material properties causing the following effects

a heating by ~~of~~ radiation absorption ~~for heating of~~ said beam,

~~of radial thermal conducting for creating a distribution of~~  
temperature distribution, dependent on said heating by said thermal  
conduction and

creating a thermal lens for said beam by said~~of thermal dispersion~~  
dependent on said temperature distribution in order to generate a  
thermal lens;

for the purpose of compensation said effects being distributed over said  
at least three elements and~~therefore, for compensating said thermal~~  
~~optical effects, said functions of absorption, radial thermal conductivity~~  
~~and thermal dispersion are distributable to said three elements where~~  
there is no need for only one and the same element to fulfill all said  
functions.

2. (Currently Amended) Method according to Claim 1, wherein  
two not adjacent elements of said at least three optical elements are  
transparent optical solid bodies

and at least one of said at least three elements between said optical solid  
bodies being a compensating medium;

said optical solid bodies having a prescribed radiation absorption of the  
radiation of said beam;

by said ~~prescribed radiation-absorption of the radiation of said beam and~~  
~~said thermal conduction said temperature distribution is created in said~~  
~~optical solid bodies~~ ~~a radial heating pattern is created by an incident~~  
radiation,

said ~~radial heating pattern~~ temperature distribution being imprinted by  
said ~~intimate-close thermal~~ contact to ~~the said~~ compensating medium for  
compensating thermal optical effects in said optical components and said  
adjacent elements, respectively.

3. (Currently Amended) Method according to Claim 2, wherein  
said compensation medium and said adjacent solid bodies having  
peripheries, said peripheries ~~have a prescribed absorption of a laser~~  
~~radiation in the beam path and said compensation medium and said~~  
~~adjacent solid bodies are cooled to the same temperature at their~~  
~~periphery.~~

4. (Currently Amended) Optical unit which can be brought into  
a beam path of an optical arrangement for compensating thermal optical  
effects of optical components present in a beam of said ~~the beam path of~~  
the optical arrangement, comprising:

at least three optical transparent elements in said beam path for  
compensating

said at least three optical elements having ~~an intimate~~ a close thermal  
contact,

adjacent elements of said at least three elements having different  
material properties and cooperate effectively for said compensating,

said different material properties are

a different absorption for radiation of said beam,

a different thermal conduction or

a different thermal dispersion,

said different material properties causing the following effects

~~onto said at least three optical elements for the purpose of  
compensation following material properties are distributable,~~

a heating by means of radiation absorption of said beam,

a distribution of temperature dependent of said heating by  
said radial thermal conduction for generating a power dependent  
temperature distribution, and

creating a thermal lens for said beam by said thermal  
dispersion dependent on said temperature distribution for  
generating a thermal lens;

~~therefore, for compensating said thermal optical effects said functions of absorption, radial thermal conductivity and thermal dispersion are distributable to said three elements where~~ for the purpose of compensation said effects being distributable over said at least three elements and there is no need for only one and the same element to fulfill all said functions.

5. (Currently Amended) Optical unit according to Claim 4, wherein

two not adjacent elements of said at least three optical elements are transparent optical solid bodies having a radiation absorption, and

at least one of said at least three elements between said optical solid bodies being a compensating element,

said compensation element having an optical compensating space being filled with an optically transparent compensating medium,

said compensating medium having ~~an intimate close thermal contact in that manner~~ to said adjacent optical solid bodies in a manner that good heat transfer from the solid bodies to the compensation medium is ensured.

6. (Previously Presented) Optical unit according to Claim 5, wherein said compensation space extends perpendicular to the optical axis of the beam path.

7. (Currently Amended) Optical unit according to Claim 5,  
wherein a radial extent of said compensation space relative to the optical  
beam path is ~~adapted to being selected to be identical~~ to that of the  
adjacent solid bodies.

8. (Previously Presented) Optical unit according to Claim 5,  
wherein the solid bodies adjacent to said compensation medium are held  
with the aid of a cooling holder.

9. (Currently Amended) Optical unit according to Claim 5,  
wherein  
said compensation medium being a material, ~~which~~ transmits no  
mechanical shear forces, and

an expansion space is connected to said compensation space into  
which said compensation medium can undertake volumetric equalization  
in the event of thermal loading.

10. (Currently Amended) Optical arrangement having a beam  
path and with an optical unit for generating or amplifying radiation  
having an optical active medium,  
said radiation being a beam traveling at said beam path,  
said unit being part of optical arrangement,

said optical active medium being divided into partial separated optical media,

said unit comprising at least three transparent optical elements,

two of said at least three elements situated at each side of an optical third element of said two elements being said partial, optical active media,

having

~~at least one optically active medium being part of said unit,~~  
~~wherein said active medium being subdivided into several partial optical solid media,~~

~~at least one said optical third element being a compensation space filled with an optical transparent compensation medium being arranged as an optical element between two of said partial optical solid media,~~

said compensation medium having ~~an intimate~~ a close thermal contact to each of said adjacent partial optical solid media and being used in cooperation with said partial optical solid media,

said partial optical solid media and said compensation medium having different material properties and cooperate effectively for said compensating,

said different material properties are

a different absorption for said radiation of said beam,

a different thermal conduction or

a different thermal dispersion,

said different material properties causing the following effects

a heating by of radiation absorption for heating of said beam,

of radial thermal conducting for creating a distribution of  
temperature dependent on said heating by said thermal conduction, and

of thermal dispersion in order to generate creating a thermal lens  
for said beam by said thermal dispersion dependent on said temperature  
distribution;

said partial-optical solid media having a prescribed radiation absorption  
of the radiation of said beam;

by said prescribed radiation-absorption of the radiation of said beam and  
said thermal conduction said temperature distribution is created in said  
optical solid mediaa radial heating pattern is created by an incident  
radiation,

said temperature distribution



~~said radial heating pattern~~ being imprinted by said ~~intimate-close~~  
thermal contact to said compensating medium for compensating thermal  
optical effects in said ~~partial-optical~~ media,  
  
for the purpose of compensation said effects being distributed over said  
at least two partial optical solid media and said at least one  
compensation medium and there is no need for only one and the same  
optical element to fulfill all said functions.

11. (Previously Presented) Method according to claim 3,  
wherein said compensation medium and said adjacent solid bodies are  
cooled to the same temperature at their periphery in an encompassing  
fashion at the same radial distance from the axis of the beam path.

12. (Currently Amended) Method according to claim 2 for  
compensating thermal optical effects in a laser resonator,  
  
said optical beam being a laser beam oscillating in said laser resonator,  
  
said laser resonator having a pumping optical radiation,  
  
said at least three optical elements having also a prescribed absorption  
for said pumping optical radiation,  
  
said absorption for said pumping optical radiation being typically much  
stronger as compared to the absorption of the oscillating beam radiation,

both of said absorptions creating said heat

~~wherein said optical solid bodies having a prescribed absorption of said pumping optical radiation.~~

13. (Previously Presented)      Optical unit according to claim 5, wherein said optical compensation space is completely filled with said compensating medium.

14. (Previously Presented)      Optical unit according to claim 5, wherein said compensation space extends radially symmetric to the optical axis of the beam path.

15. (Currently Amended)      Optical unit according to claim 8, wherein said cooling holder completely encompasses the entire ~~envelopes~~ envelope of the solid bodies in ~~intimate~~ close thermal contact.

16. (Currently Amended)      Method for compensating thermal optical effects in an arrangement containing optical components generating ~~a beam path~~ or amplifying radiation,  
said arrangement having a beam path for said generated or amplified radiation and includingsaid compensating being accomplished by at least three optical transparent elements ~~in cooperation having an intimate~~ close thermal contact,

said radiation being radiated in a beam,

adjacent elements of said at least three elements having different material properties,

said different material properties are

a different absorption for said radiation of said beam,

a different thermal conduction or

a different thermal dispersion,

said different material properties causing the following effects of  
~~radiation absorption, radial thermal conducting, and thermal dispersion,~~  
~~said method comprising:~~

a heating by said radiation absorption of said beam;

~~creating a distribution of temperature~~ dependent on said radiation  
power by said radial thermal conducting; conduction and

~~generating creating~~ a thermal lens for said beam by said thermal  
dispersion dependent on said temperature distribution;

for the purpose of compensation said effects being distributed over said  
at least three elements and there is no need for only one and the same  
element to fulfill all said functions.

17. (Currently Amended) Method according to claim 16,  
wherein two not adjacent elements of said ~~at least three~~ optical elements  
are transparent optical solid bodies and at least one of said at least three  
elements between said optical solid bodies being a compensating  
medium,  
said optical solid bodies being active media and having a prescribed  
radiation absorption, said method further comprising:  
by said prescribed radiation absorption of the radiation of said beam and  
said thermal conduction said temperature distribution is created in said  
optical solid bodies, creating a radial heating pattern by an incident  
radiation;  
said temperature distribution being imprinted by said close thermal  
contact to said compensating medium for compensating thermal optical  
effects in said optical components and said adjacent elements,  
respectively based on imprinting said radial heating pattern by said  
intimate contact to said compensating medium.

18. (Previously Presented) Method according to claim 17,  
wherein said solid bodies have a prescribed absorption of a laser  
radiation in the beam path, said method further comprising:  
cooling said compensation medium and said adjacent solid bodies  
to the same temperature at their periphery.

19. (Previously Presented) Method according to claim 18,  
wherein said cooling said compensation medium and said adjacent solid  
bodies to the same temperature at their periphery is in an encompassing  
fashion at the same radial distance from the axis of the beam path.

20. (Currently Amended) Method according to claim 17,  
wherein said arrangement containing optical components is a laser  
resonator,  
said laser resonator having a pumping optical radiation entering said  
solid optical active media and being absorbed inside said optical media  
partially for pumping,  
~~and wherein said prescribed absorption of said optical solid bodies is an~~  
said absorption of said pumping optical radiation being typically much  
stronger as compared to the absorption of the radiation of the beam,  
therefore said different material properties of said solid optical active  
bodies and said optical transparent compensation medium causing the  
following effects,  
a heating by radiation absorption of said beam and said pumping  
radiation,  
a distribution of temperature dependent on said heating by said thermal  
conduction and

creating a thermal lens for said beam by said thermal dispersion  
dependent on said temperature distribution,  
by said absorption of the radiation and said thermal conduction said  
temperature distribution is created in said solid optical active bodies,  
said temperature distribution being imprinted by said close thermal  
contact to said compensating medium for compensating said thermal  
optical effects.

21. (New) Optical arrangement according to claim 10, having an optical pumping source generating a pumping radiation,  
said partial optical media having peripheries,  
said pumping radiation entering each of said partial optical media by said peripheries and being absorbed inside said optical media partially for pumping,  
said absorption of said pumping optical radiation being typically much stronger as compared to the absorption of the radiation of said beam, therefore said different material properties of said at least two partial optical solid media and said at least one optical transparent compensation medium causing the following effects,  
a heating by radiation absorption of said beam and said pumping radiation,

a distribution of temperature dependent on said heating by said thermal conduction and  
creating a thermal lens for said beam by said thermal dispersion dependent on said temperature distribution,  
by said absorption of the radiation and said thermal conduction said temperature distribution is created in said partial optical media,  
said temperature distribution being imprinted by said close thermal contact to said compensating medium for compensating said thermal optical effects.

22. (New) Optical arrangement according to claim 21, having cooling media,  
said compensation medium having also peripheries,  
said peripheries of said several partial optical media and of said compensation medium being cooled by said cooling media,  
said pumping radiation passing said cooling media.